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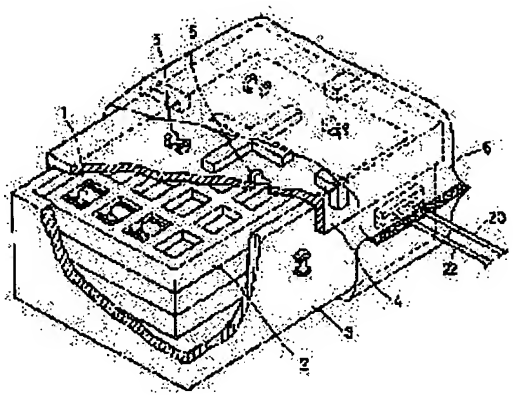
(54) INK JET RECORDING HEAD OF PACKAGED STATE

(57)Abstract:
PURPOSE: To eliminate a decrease in performance during storage and conveying due to fixture or condensation of ink.
CONSTITUTION: An ink jet recording head 1 attachable to or detachable from an ink jet recorder is contained in a conductive head tray 2 by discharging inner ink, and when it becomes a predetermined number, it is contained in a sheathed vessel 3, coated with a cover 4, filled in an aluminum laminated film package bag 6, a suction tube 20 and a supply tube 22 are inserted into the bag 6 to discharge the air in the vessel 3, to charge inert gas, the suction tubes 20, 22 are then drawn, the bag 5 is thermally sealed to be enclosed.



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CLAIMS

[Claim(s)]
[Claim 1] The ink-jet recording head of the packing state characterized by discharging internal ink, holding an ink-jet recording head removable to an ink-jet recording device in the container for conveyance, discharging the air in this container for conveyance, being filled up with inert gas, being sealed, and changing.
[Claim 2] Inert gas is the ink-jet recording head of the packing state according to claim 1 characterized by being either nitrogen gas or gaseous helium.
[Claim 3] The ink-jet recording head of the packing state according to claim 1 characterized by having poured in the high boiler into an ink-jet recording head.
[Claim 4] A high boiler is the ink-jet recording head of the packing state according to claim 3 characterized by being either a polyethylene glycol or a glycerol.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the ink-jet recording head of the packing state for keeping or conveying a removable ink-jet recording head to the ink-jet recording device which breathes out ink and records on a record medium.
[0002]
[Description of the Prior Art] In various devices, such as a printer, facsimile, and a reproducing unit, an ink-jet recording device is being widely used as a means to record on a record medium-ed.
[0003] The ink-jet recording device has composition which breathes out and records ink using heat energy from the recording head which countered the record medium-ed, and the ink-jet recording device which records on the record form which is a record medium-ed by equipping with the ink-jet recording head (henceforth a recording head) which carries out the regurgitation of the ink removable is spreading.
[0004] A recording head is composition which has the ink delivery which carries out the regurgitation of the ink, the ink passage which receives ink from an ink cartridge and passes to an ink delivery, and a heater means to generate the heat energy which the ink in ink passage is heated [heat energy] and produces a foam, and records on a record medium by breathing out ink from an ink delivery (orifice).
[0005] And when recording in the ink of a different color and changing a recording method, or when a certain trouble arises, the recording head which was being used will remove from an ink-jet recording device, it will exchange for another recording head, and the recording head is circulating in the commercial scene as consumables of a simple substance.
[0006] after having arranged on the tray in the state where it filled up with ink, having conveyed, after inspecting that a recording head is normal, when conveying and keeping a recording head conventionally in a commercial scene, or color concentration's having obtained and replacing by cone ink, it arranged on the tray and the circumference was sealed with the plastic bag, the polyethylene bag, etc. Furthermore, when sealing and keeping it with a plastic bag, a polyethylene bag, etc., moisturization material might be put in so that the interior might not dry.
[0007]
[Problem(s) to be Solved by the Invention] However, when the interior of a recording head was filled up with ink at the time of conveyance, the ink in a nozzle fixed, or it thickened by moisture evaporation of ink and a recording head was attached during storage at the main part of a printer, printing grace might deteriorate.
[0008] Moreover, if a moisturization member is put in and it is sealed and kept with vinyl etc. for fixing prevention, dew condensation will occur in the whole recording head under the influence of outside air temperature. When it attached in the main part of a printer in this state, there was fault that electric contact carried out a chute etc. and damaged a recording head. Moreover, in prolonged storage, the contact discolored and the fault which the plating poor section, the pinhole section, etc. corrode was also generated.
[0009] this invention was not made in order to cancel the above-mentioned conventional trouble, and it aims at offering the ink-jet recording head in the packing state where a performance does not deteriorate during storage / conveyance by fixing of ink, generating of dew condensation, etc.
[0010]
[Means for Solving the Problem] For this reason, the composition characterized by the ink-jet recording head of the packing state concerning this invention discharging internal ink, holding an ink-jet recording head removable to an ink-jet recording device in the container for conveyance, and discharging the air in this container for conveyance, and filling it up with inert gas, sealing it, and changing tends to attain the aforementioned purpose.
[0011]

[Function] Since extract the ink in a recording head, the air in the container for conveyance which held the recording head discharges, it is filled up with inert gas and it has sealed by the above composition, it can prevent that ink does not fix within a recording head during storage and conveyance, or dew condensation does not occur inside seal, and the performance of a recording head deteriorates during storage and conveyance.
[0012] Furthermore, by pouring in a high boiler into an ink-jet recording head, the operation which prevents that ink fixes within the above-mentioned recording head, or dew condensation occurs inside seal can be demonstrated more effectively, and can hold and keep the stable performance for a long period of time.
[0013]
[Example] Hereafter, an example explains the ink-jet recording head of the packing state concerning this invention.
[0014] (The 1st example) drawing 1 -- a part of 1st example -- it is a cross-section perspective diagram
[0015] 1 is a recording head, 2 is a head tray, and it is formed with conductive polystyrene etc. 3 is the sheathing container of the head tray 2, and is formed by synthetic-resin material, such as polypropylene. 4 is the lid of the sheathing container 3 and 5 is a breakthrough, since it is filled up with degassing and inert gas from the interior of the sheathing container 3, it prepares, and the circumference of a breakthrough 5 is formed so that it may not be sealed, in case degassing is carried out.
[0016] 6 is a packing bag made from an aluminum laminate film (henceforth an aluminum lamination bag), and is constituted from the front face by nylon / aluminum / polyethylene, after being filled up with inert gas, the sealing seal of it is carried out by heat welding, and it is intercepted from the open air.
[0017] A recording head 1 extracts the ink which is in the interior after a predetermined printing inspection end, after washing and carrying out a vacuum drying with pure water etc., it is put in order by the head tray 2 which has the conductivity for conveyance, is put in by the sheathing container 3 in time with predetermined quantity ********, and can put a lid 4. And after covering the sheathing container 3 with the aluminum lamination bag 6, extracting internal air and being filled up with the nitrogen gas which is inert gas, or gaseous helium, the heat sheet of the aluminum lamination bag 6 has been carried out.
[0018] Drawing 2 is the schematic diagram showing an example of pouring of degassing from the aluminum lamination bag 6, and inert gas which contained the sheathing container 3.
[0019] The siphon for 20 in drawing extracting air from the sheathing container 3 and 21 are connected to the siphon 20 with the suction pump. 24 in which the supply pipe for inert gas pouring in 22 and 23 have an opening-and-closing function by valve portion material is the tank filled with inert gas.
[0020] First, the siphon 20 and a supply pipe 22 are inserted in opening of the aluminum lamination bag 6, and the heat seal of the opening is carried out temporarily. 30 shows this heat seal section.
[0021] In case [this] a suction pump 21 is operated and internal air is extracted in the above-mentioned state, the valve 23 by the side of a supply pipe 22 is in a stoppage state. After extracting the air of a predetermined time or the specified quantity, a valve 23 will be in an open state and inert gas will be poured in from a tank 24. At this time, a suction pump 21 stops an operation. In order to extract air better from the sheathing container 3 contained into the aluminum lamination bag 6, it is possible by repeating the above-mentioned degassing and inert gas pouring.
[0022] If the above-mentioned operation is ended, the suction pipe 20 and a supply pipe 22 will be sampled from the aluminum lamination bag 6, the heat seal of the opening 30 will be carried out again, and the interior will be intercepted from the open air.
[0023] By this example, the stability test evaluation result of the printing grace of the kept recording head 1 is shown in Table 1.
[0024]
[Table 1]

形　態	保管温度	保管期間	プリンタ搭載時の不具合発生の有無
インク有	常　温	3日	△～○　印字劣化　2～5%発生
		10日	△　〃　10～20%発生
		30日	×　〃　50%以上発生
	60℃ ↔常温 *1	3日	×　印字劣化　50%
		10日	×　〃　50%以上
		30日	×　〃　80%
インク有＋保湿材	常　温	3日	△ } 印字品位は全体として良いがヘッド全体に結露発生
		10日	△
		30日	×　結　露
	60℃ ↔常温	3日	×　結露多い
		10日	×　〃
		30日	××　(電気接点部変色)
本実施例 (インクなし)	常　温	3日	○
		10日	○
		30日	○
	60℃ ↔常温	3日	○
		10日	○
		30日	△～○　1～2%発生

各50個をテストして評価す。

＊1は12時間毎に60℃↔常温をくり返した。

[0025] It has checked that the test evaluation result of an example had a big effect in the printing stability of a recording head as mentioned above.

[0026] (The 2nd example) In the 1st example, although the ink in a recording head is extracted and being packed through processes, such as washing and a vacuum drying, it is also possible to consider as the primary treatment which omitted the time and effort which carries out a vacuum drying comparatively like [in the case of about / for short-time storage, for example, movement at home, / transportation] the 1st example.

[0027] The 2nd example is the ink-jet recording head packed by primary treatment. Drawing 3 is the perspective diagram of the 2nd example, the same sign shows the same as that of the 1st example of the above, or a considerable portion, and it omits duplication explanation.

[0028] There is no lid in the sheathing container 3 which holds the head tray 2 in the 2nd example, and there is also no breakthrough 5. And it has composition which covered and sealed a part for upper surface opening of the sheathing container 3 by the aluminum laminate film 6.

[0029] And a high boiler is poured in into a recording head 1, and the inside of the sheathing container 3 can prevent dew condensation by fixing and the moisturization material of ink like before by making inert gas full.

[0030] The high boiler poured in into a recording head 1 is water-soluble, and is performed. For example, the organic substance, such as a polyethylene glycol and a glycerol, is good.

[0031] The test evaluation result of the 2nd example is shown in Table 2.

[0032]

[Table 2]

形　態	保管温度	期　間	プリンタ搭載時の不具合発生の有無
高沸点溶剤入	常　温	3日	○
		10日	○
		30日	△　(5～50%発生)
	60℃ ↔常温	3日	○
		10日	△　(5～10%)
		30日	△　(10～20%)

[0033] As mentioned above, the effect was accepted compared with the conventional conveyance storage, the thing of a comparatively short transportation period came out enough in the 2nd example of this simple form, and a certain thing was confirmed.
[0034] Drawing 3 is the perspective diagram showing the form at the time of the simple conveyance storage by the 2nd example of the above, pastes up a laminate film 6 on the sheathing container 3 with a double-sided tape etc., and is intercepted from the open air, and it is [drawing 3] full of the interior of a container 3 in inert gas.
[0035] (The 3rd example) The 3rd example is suitable for the recording head for service which is not what made it the key objective to convey collectively and keep a lot of recording heads, but is a suitable example for conveyance, storage, etc. of the recording head of a decimal, for example, are exchanged when the recording head carried in the printer breaks down.
[0036] Drawing 4 is the perspective diagram of the 3rd example, and the same sign has shown the same as that of the aforementioned example, or the considerable portion.
[0037] After ending a predetermined printing inspection etc., after the recording head 1 shown in drawing 4 performs ink omission, pure water washing, and a vacuum drying, it is dedicated to the head tray 12 for items made from conductive polyethylene, is put into the aluminum lamination bag 6, has carried out the heat seal of the opening, and has composition with which **** 40 for service is put in and provided.
[0038] In case a heat seal is carried out, internal air is extracted using a means which was explained in the 1st example, and it is filled up with inert gas. However, in this example, since it will expand with the reduced pressure in air transport etc. at the time of transportation if inert gas is put in so much in the aluminum lamination bag 6, it pours in so that the amount defined beforehand may not be exceeded.
[0039] The test evaluation result is the same as that of the 1st example shown in the aforementioned table 1. In addition, to the generated printing degradation generating article, grace can be easily recovered with the recovery mode of a printer.
[0040] In recovery mode, the performance of a discharge head can be recovered by performing predetermined pulse printing for the electric energy to the **** heater used for **** as 1.48 or more times of the **** minimum energy. Specifically, it is three to 7x104. A pulse is added. And at the time of service recording head exchange, recovery mode can be carried out by the serviceman or the user.
[0041]
[Effect of the Invention] By according to this invention, dedicating to the container inert gas was [container] full of the recording head which extracted ink in the packing for conveyance of an ink-jet recording head, and storage, and sealing with a seal film, as explained above, ink can fix for a nozzle like before, or it can prevent dew condensation by moisturization material occurring, and quality can be stabilized, and it can be conveyed and kept.
[0042] Moreover, since the open air which pollutes dust and the recording head in the atmosphere by pouring in inert gas can be eliminated, quality control is also easy. Even if furthermore saved for a long period of time, since there is almost no air, the oxidization and corrosion of a member which constitute a recording head can be prevented.

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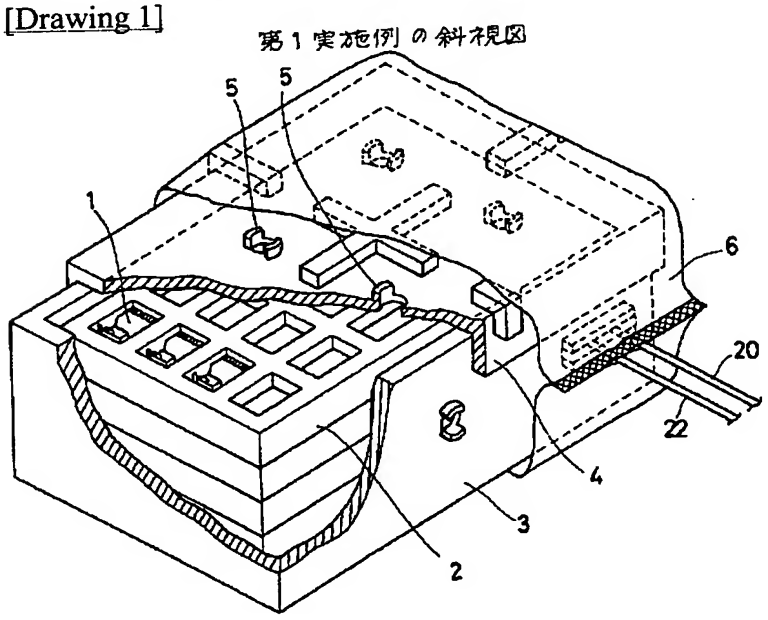
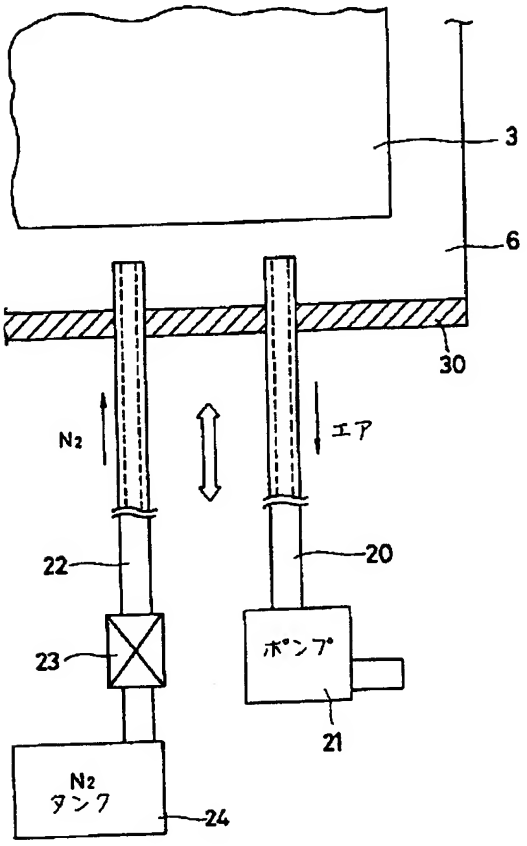
DRAWINGS

[Drawing 1]



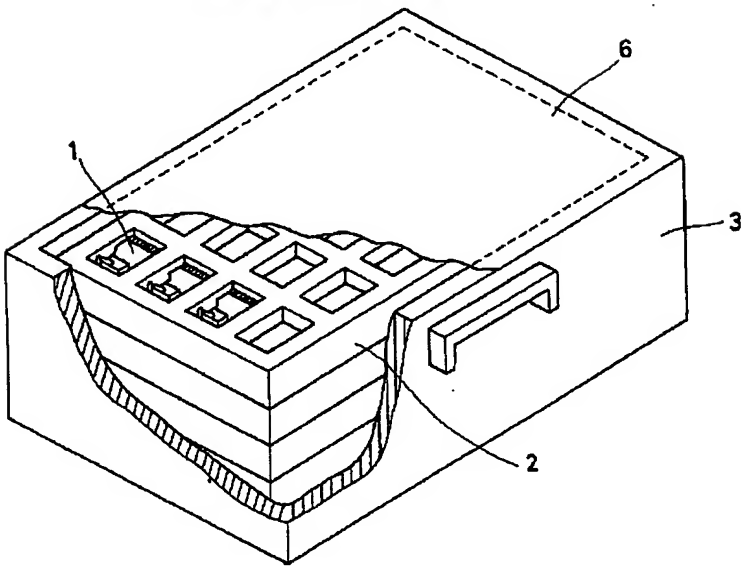
[Drawing 2]

第1実施例のエア抜きガス注入手段概要図



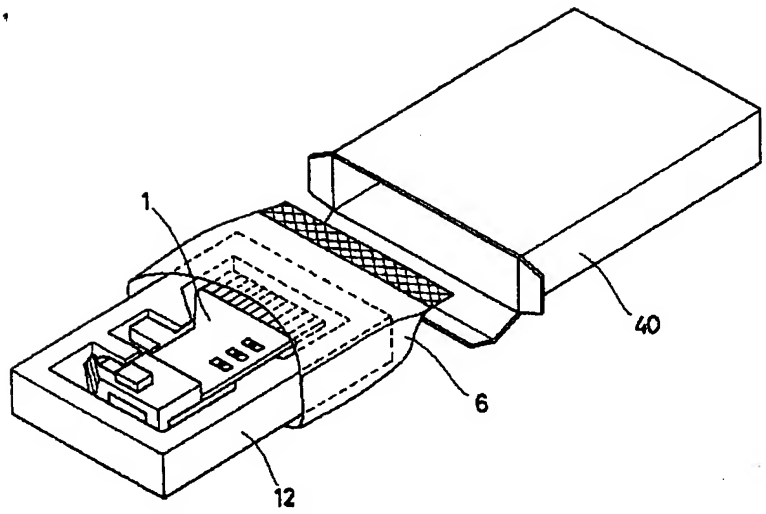
[Drawing 3]

第2実施例の斜視図



[Drawing 4]

第３実施例の斜視図



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